ANNEX V

CIA POSITION ON CAPABILITY[1] OF
CHINESE COMMUNIST RAILROADS

29 January 1954

Statement

In attempting to assess the capability of Chinese Communist railroads, the only basic sources of current statistics are statements made by the Chinese Communists themselves. Not all the figures necessary for such an assessment are given directly, although some can be derived by calculation from those which are available. Because there has been some question about whether Communist terminology relating to operations and traffic is exactly equivalent to US terminology, CIA has approached Chinese Communist figures as follows:

a. All intelligence which could be obtained on each operating and traffic factor was assembled, including Chinese Communist statements, historical Manchukuoan and Chinese Nationalist data, Soviet data, interrogations of individuals who had left China recently, and reports from covert sources on China.

b. This information was weighed and an estimated figure for each factor was derived therefrom.

Although many of these estimated figures show a slightly lower level of performance than the corresponding announcements of the Chinese Communists would indicate, they do reveal that the overall traffic movement announced by the Chinese Communists is of approximately the proper order of magnitude.

1/ The term capability, as used in this annex, is defined as the maximum amount of traffic which can be moved over the railroad system for a sustained period with the existing track facilities, operating methods, freight cars, and locomotives as of a given date. If demands for traffic movement sufficiently exceed existing capability, further increases in capability are possible over a period of time through such measures as further increasing average net load per car and per train, improvements in signalling and communications, increasing the number of operable freight cars and locomotives, and even by installation of double track on previously single-tracked lines.

The CIA position on individual elements which lead to a conclusion on the capability of Chinese Communist railroads as of the end of 1952 is as follows:

1.	Total freight car park (units)	51,995 to 59,270 2/
2.	Operable freight car park (units)	46,100 to 53,100 2/
3.	Tons actually originated (millions of metric tons)	131
4.	Net ton-kilometers actually performed (billions)	59.5
5.	Average length of loaded haul (kilometers)	454
6.	Ratio of empty to total freight car kms. (percent)	30
7.	Average empty haul of freight car during turn-around period (kms.)	194
8.	Total movement of freight car during turnaround period (kms.)	648
9.	Average freight car speed between terminals (km/hr)	12.0
10.	Average travel time of freight car during turn-around period (days)	2.1
11.	Average time at loading and unloading terminals, including switching and delays (days)	1.3
12.	Total turnaround time (days)	3.4
13.	Average daily carloading capability (units)	13,560 to 15,620 2/
14.	Average net load per loaded freight car (metric tons)	27.5

Capability

15.	Average daily tonnage originated (metric tons)	373,000 to 430,000 2/
16.	Annual tonnage originated (millions of metric tons)	136 to 157 2/
17.	Annual net ton kilometers performed (billions)	61.7 to 71.3 2/

Supporting Evidence

1. Freight car park. The base figure for this estimate is the total of 67,832 freight cars in China proper plus Manchuria in 1945 [redacted] 25X1A2g
25X1A2g [redacted] This figure includes narrow gauge cars in China proper, but excludes most narrow gauge cars in Manchuria. The next available figure is the Chinese Communist statement in October 1949 that they had on hand 39,600 freight cars [redacted] 25X1A2g. This figure can be derived from the 67,832 cars in 1945 as shown in Tab A. An estimated December 1952 inventory can be derived from the October 1949 figure by various additions and losses as shown in Tab B.

2/ The range of this estimate of the total and operable freight car parks is explained in paragraphs 1 and 2 below. The other ranges shown in this column result from and correspond to the range in estimates of the freight car park. CIA has no evidence that capability of Chinese Communist railroads in 1952 significantly exceeded the actual level of traffic performed. It has therefore adopted the lower figure in the range as its estimate of capability.

2. Of the 51,995 to 59,270 total freight cars in China, it is estimated that 5,896 to 6,196 were out of operation for repairs in December 1952. In October 1951 the Chinese Communists announced their repair performance which indicated that of cars inoperable in February 1950, about 5,296 were still inoperable. It is assumed that 2,500 of these were repaired by December 1952 and that the remainder should probably be considered retired but are included here under cars out of operation. It is estimated that 4 percent of the total park are out of operation at any time for normal repairs, or 2,100 to 2,400 units. Cars damaged in North Korea from June 1950 to May 1953 are estimated at 33,000 cars (CINCPAC cable, S.), of which an estimated 28,000 were damaged to December 1952. It is assumed that about half the damage may be allocated to Chinese cars, or about 470 cars per month. Therefore, it is assumed that about 1,000 damaged Chinese cars were out of operation for repairs in December 1952. This leaves an operable car park of 46,100 to 53,100. (See Tab C)

3. The 131 million tons originated is based on the Chinese Communist statement (FBIS, Peiping, NCNA in Chinese Numeral Code, 16 Feb. 1953, U.). The statement does not permit a firm determination of whether this figure represents tons originated, or tons carried (which would include duplication of these tonnages which moved on lines of more than one region). CIA concludes that the figure represents tons originated on the following basis: a) If it were tons carried, then the tons originated figure would be less, perhaps 100 million tons or less. Since the Communists claim to have performed 59.5 billion ton-kilometers, this would give an average length of haul of 595 km. or more. Such a haul seems to be too long when compared with prewar and wartime experience, while the 454 km. haul derived from 131 million tons seems reasonable. b) The figure of 131 million tons is of approximately the same magnitude as the 114 million tons originated in all of China in 1941 (excluding central and south China, for which data are not yet available) [redacted] FDD, U-3643, 30 June 1953, R; Research Division of Manchuria, Resources Control Commission, "Transportation in Manchuria," Shenyang, Feb. 1948, R). Data are not available for the years 1942 to 1945, but it is likely that tons originated increased somewhat over the 1941 figure. c) ORR estimates of production of selected basic commodities in 1952 totaled 203 million tons; it is conservatively estimated that these basic commodities provided at least 52.4 million tons of originated freight. When movements of all other commodities are added, the traffic in 1952 comes to at least 84.4 million tons, which is a minimum figure (See Tab D). d) The operation of the Chinese railroads as a unified system would make the compilation of tons carried, including duplications for different lines, a meaningless and wasteful procedure. e) Because of the post-Communist shift in the Chinese traffic pattern to a general north-south orientation, there has been a proportionately greater burden placed on railroads compared with the prewar distribution of traffic between railroads and domestic water transport. In addition, there has been a redirection of a substantial volume of foreign trade from ocean transport to overland rail transport.

25X1A2g

4. The 59.5 billion ton-kilometer performance in 1952 is based on Chinese Communist statements (FBIS, Peiping, NCNA in Chinese Numeral Code, 16 Feb. 1953, U.). While such a figure might be given in terms of gross ton-kilometers (including both weight of freight and weight of freight cars; a net ton-km. figure would be about 55 percent of gross), it would be an abnormal practice to announce this as performance. Gross ton-kilometers have no statistical usefulness except in relation to measurement of locomotive performance or (much less likely in China) wear on rail and track structure. From the standpoint of traffic performance, gross ton-kms. would be a meaningless figure. Also, if the 59.5 billion ton-kms. be considered as gross, the resulting level of net or revenue ton-kms (32.7 billion ton-kms.) would not require as many cars as the minimum estimate of the Chinese car park. By comparison, China railroads in 1941 performed 36 billion net ton-kms., and that year was not a peak of performance. Furthermore, average length of haul was somewhat shorter at that time.

5. Average length of loaded haul is derived by dividing ton-kms. (paragraph 4) by tons originated (paragraph 3). The 454 km. average haul in 1952 may be compared with an average length of haul in 1941 for all China (excluding central and south China) of about 315 km. This figure may not have been a war-time peak. This is another argument against any theory that the 59.5 billion ton-kms. might be gross tons. Considered thus, average haul would drop to 250 kms, which appears far too low to be reasonable.

6. The ratio of empty freight car kms. to total car kms. is based on the fact that in Manchuria in 1939-42 this figure ranged between 24.8 and 28.0 percent (South Manchurian Railway, Annual Railway Statistics, 1939-1942, U.) In North Korea in 1947 and 1948 the figure was 29 and 28 percent, respectively (Army, FEC, ATIS Enemy Interrogation, Korea No. 36, 11 May 1951, C.). The Chinese railroad system was given a slightly higher figure of 30 percent because it was assumed that in view of the heavy net load of 27.5 tons per car (paragraph 14), somewhat more cars would be returning empty instead of being lightly loaded for return hauls.

7. Average empty haul of freight car during turnaround period was derived by multiplying the average length of haul (paragraph 5) (which represents average haul of the loaded car) by the ratio of empty to loaded haul. Since the empty haul is taken as 30 percent of the total (paragraph 6), then the loaded haul is 70 percent of the total, and the ratio of the empty to the loaded haul is 42.9 percent. The average loaded haul of 454 km. (paragraph 5) multiplied by 42.9 percent gives an empty haul of 194 km.

8. Total movement of freight car during turnaround period is the total of the 454 km. loaded (paragraph 5) and 194 km. empty movement (paragraph 7), or 648 km.

9. Average freight car speed in trains between terminals is based on Chinese Communist statements of train speed (excluding stops at division points enroute) from 1950 to 1953 for various railroad bureaus and for the nation as a whole. This figure, of about 20 km/hr, checks with Manchurian and China Proper railroad figures (China, Ministry of Railroads, "Statistics of Chinese National Railways, 1935-6," Nanking, 1937, U; South Manchurian Railway, "Annual Railway Statistics for 1942," vol. 2, Tables 13 and 16, R). With a total freight car movement during a turnaround period of 648 km., travel time would thus total 32 hours. With the 648 km. haul, divided by an estimated 160 km. between divisions (JIC 635/1, S), the car would pass through 4 divisions, or would make 3 division stops. It is estimated that each division stop takes 6 hours (JIC 635/1, S); therefore, 3 divisions stops would take a total of 18 hours. Thus total transit time from loading terminal to the next loading terminal, including division stops, would equal 50 hours, and since this time is required to cover 648 km., the average travel speed is 13 km/hr. ORR has utilized the slightly lower figure of 12 km/hr. which permits slightly longer division stops.

10. Average travel time of freight car during turnaround period is shown above in deriving average freight car speed between terminals. Since total time is 50 hours, this equals 2.1 days.

11. Average time at loading and unloading terminals is based primarily on Chinese Communist information. In making improvements in turnaround time of freight cars, it is at the loading and unloading terminals that the greatest time savings can be made because such a high percentage of the turnaround period is spent here. It is believed by ORR that significant improvements are possible in China because the relatively small number of operable freight cars (46,100 to 53,100), and the large number of railroad workers (about 620,000 according to Peiping Jenmin Jihpao, 15 November 1953, U.) mean that a careful check can be maintained on each car, and loading and unloading time can be expedited. In addition, the US intelligence community agrees that there is probably no shortage of locomotives. ORR believes it is likely, therefore, that this has minimized delays experienced

by freight cars at loading and unloading terminals. The Chinese Communists claim that "station stopping time" (elapsed time between arrival of a loaded car at its destination and its departure from that point, either reloaded or empty) for the nation as a whole and for individual railroad bureaus lies between 10 and 17 hours. (China Project 128, Shanghai Chiehfang Jihpao, 1950, U; [redacted]; Peiping Jenmin Tiehtao, Mar. 1951, R; China Project 545, 25 Jan. 1951, U; [redacted] FBIS, Daily Report, Far East, 4 Nov. 1951, R). It is believed, therefore, that 15 hours is a reasonable time for this operation. That this is attainable is indicated by 1934 Chinese Nationalist data showing that detention of freight cars at stations averaged 19.15 hours (Chuke Ling, "China's Railway Rolling Stock," Univ. of Washington, 1946, U). There is some question of whether this was time spent only at loading and unloading stations, or whether it also included division stops. However, the breakdown of detention time indicates it may be only for time at loading and unloading stations. Thus, 15 hours for the loading terminal plus 15 hours for the unloading terminal totals 30 hours or 1.3 days.

12. Average turnaround time is derived by adding 2.1 days of travel time of freight car during turnaround period to 1.3 days average time spent at loading and unloading terminals, including switching and delays. This gives a total turnaround time of 3.4 days.

13. Average daily carloadings capability is obtained by dividing the operable freight car park (paragraph 2) by the turnaround time (paragraph 12)

14. Average net load per loaded freight car is based primarily on Chinese Communist statements. The various figures for individual carloads, as well as average loading in individual bureaus and for the nation as a whole, indicate an average of about 27.5 net tons per loaded car. (FBIS, Peiping, 28 Aug. 1952, S; FDD, U-3289, 14 Apr. 1953, R; Army, ALO Hong Kong R-43-53, 14 Mar. 1953, R; Jenmin Jihpao, 16 Aug. 1952, U; FBIS, Wuhan, 23 July 1952, C; FDD U-3199, 10 June 1952, R; Chiehfang Jihpao, 21 Oct. 1952, U; FBIS, Shanghai, 11 Nov. 1952, C; State, Hong Kong D1282, 29 Dec. 1952, R; [redacted]. With an estimated average capacity per car in China of 30 metric tons, the 27.5 tons represents a loading to about 92 percent of capacity. A figure of about 80 percent of capacity has been used in the intelligence community for loading of non-military traffic (EIC-R-9, "Capability of the Trans-Siberian Railroad and Connecting Lines in Manchuria and Korea," 23 Mar 1953, S). It is estimated that a higher loading figure has been achieved in China, since great stress has been placed on the subject in Communist publications, and because photographs show heavy loading of freight, particularly in gondola cars. That this is attainable is indicated by the fact that in North Korea between 1947 and 1949 the net load per car ranged between 26.9 and 28.5 metric tons, derived by dividing freight handled by number of cars loaded [redacted], and that in Japanese-occupied Manchuria in 1939 and 1942 (which were not the peak years), net load per loaded car is calculated at 24.9 to 26.4 tons (South Manchurian Railways, "Annual Railway Statistics," U).

15. Average daily tonnage-originated capability is derived by multiplying average daily carloadings (paragraph 13) by average net load per loaded freight car (paragraph 14). This capability is based on facilities and operating conditions existing in 1952, including the temporary disturbances of railroad operation caused by the Five Antis campaign.

16. Average annual tonnage-originated capability is derived by multiplying average daily tonnage originated (paragraph 15) by 365 days.

17. Annual ton-kilometer capability is derived by multiplying average annual tonnage originated (paragraph 16) by the average length of haul (paragraph 5). This capability can be increased by greater average length of haul, since the movement time of a freight train is not a large part of total turnaround time. By contrast, a ton-kilometer increase resulting from a stationary average length of haul and increased tonnage originated would require considerably more increase in rolling stock or in efficiency of rolling stock use.

TAB A

to

ANNEX V

Derivation of Total Chinese Communist Freight Car Park in October 1949

Statement

The Chinese Communists stated in October 1949 that they had in use 30,000 railroad cars and 9,600 out of service [redacted] An 25X1A2g attempt has been made to account for this inventory by estimating losses and additions from the last previous reliable figure.

Supporting Evidence

25X1A2g

1. The base figure for this estimate is the total of 67,832 freight cars in China proper plus Manchuria in 1945 [redacted] China, Directorate of Statistics, "Statistical Abstract of the Republic of China," 1947, U). This includes narrow gauge cars in China proper, and includes 549 narrow gauge cars in Manchuria, but does not include 6,668 narrow gauge cars owned by logging railroads in Manchuria.

25X1A2g

2. The Chinese Communists stated in October 1949 that they had in use 30,000 railroad cars and 9,600 out of service [redacted] At the time the statement was made, some freight cars were still in Nationalist hands in South China.

3. The following tabulation represents ORR's estimate of deductions from and additions to the 1945 freight car park which would have resulted in an inventory of 39,600 cars in October 1949. The major unknown factor is the number of freight cars taken by the USSR.

	Freight Car Units
1945 freight car park, China plus Manchuria	67,832
Minus: Retirements, Dec 1945 to Oct 1949 (estimated at 2% of 67,832 per year)	5,196
USSR Reparations (estimated at 15% of 1945 Manchurian park of 41,984 cars)	6,288
Estimated civil war losses	2,500 to 5,000
Lost cars found by Communists in Feb 1950 inventory 1/	10,278
Losses not accounted for; possibly taken by USSR	7,867 to 5,367
Total deductions 2/	32,129
Plus: Imports, 1945 to Oct 1949	3,445
Production, 1945 to Oct 1949	452
Total additions 2/	3,897
Freight car park reported by Communists, Oct 1949	39,600

1/ A nationwide inventory of freight cars made in China in February 1950 resulted in "finding" 10,278 more cars than were originally on the statistical records of the Ministry of Railways (FBIS, Peiping, NCNA, 8 March 1950, R).

2/ Assumes that cars were neither lost to nor received from North Korea from 1945 to Oct 1949.

TAB B

to

ANNEX V

CIA, ORR Position on Total Chinese Communist Freight Car Park in December 1952

Statement

It is estimated that the total freight car inventory of the Chinese Communist railroads (standard plus narrow gauge, excepting forestry lines in Manchuria) is between 51,995 and 59,270 units in December 1952.

Supporting Evidence

The following tabulation shows the estimated losses and additions to the October 1949 park of 39,600 freight cars, from which the estimated park of December 1952 was derived:

Freight car park reported by Communists, Oct 1949		39,600
Minus:	Retirements, Oct 1949 to Dec 1952 (2% of 50,000 per year)	3,250
	Korean war losses[1]	4,500[2]
	Total deductions	7,750
Plus:	Imports, Oct 1949 to Dec 1952	700 to 2,200
	Production, Oct 1949 to Dec 1952	3,800 to 7,075
	Found in Feb 1950 inventory (see Tab A above)	10,278
	Estimated returned by USSR	5,367 to 7,867[3]
	Total additions	20,145 to 27,420
Total estimated freight car park, Dec 1952		51,995 to 59,270[4]

1/ Korean war losses to May 1953 are estimated at 15,000 (CINCPAC cable, S), of this number, it is estimated that 13,500 were lost to Dec 1952. This figure includes both Chinese and North Korean cars.

2/ These represent net loss of Chinese cars to and in North Korea, derived as follows: original North Korean park, 14,000; destroyed in North Korea to Dec 1952, 13,500; operating in North Korea at end of war, 5,000; net removals from China, 4,500.

3/ In view of the destruction of rolling stock in North Korea, and the increased tightness of the freight car park in China, it is believed that the USSR would have returned any cars taken from Manchuria (see Tab A, item 6 of table). There is no documentation available at present for this belief.

4/ First figure is calculated with minimum gains; second figure is calculated with maximum gains.

TAB C

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ANNEX V

CIA, ORR Position on Operable Chinese Communist Freight Car Park

Statement

It is estimated that of the total freight car inventory of the Chinese Communist railroads shown in Tab A, about 46,100 to 53,100 units were operable in December 1952. The remaining cars, representing about 11 percent of the total inventory, were either under normal maintenance, or were cars damaged in Korea which were under repair.

Supporting Evidence

1. The October 1949 park of 39,600 contained 9,600 inoperable cars and the 10,278 cars found in February 1950 contained 7,190 inoperable cars, giving a total of about 16,790 inoperable [redacted] 25X1A2g FBIS, Peiping, NCNA, 8 March 1950, R). In October 1951, it was reported that 11,494 cars previously inoperable had been repaired (People's Handbook, 1950, U). This left 5,296 cars still inoperable. It is estimated that by Dec 1952 another 2,500 of these had been repaired; the remainder probably should be considered retired.

2. It is estimated that the normal percentage of freight cars out of operation at any one time is approximately 4 percent of the total park.

3. Cars damaged in North Korea from June 1950 to May 1953 are estimated at 33,000 cars (CINCPAC cable, S). Of this number, an estimated 28,000 were damaged to Dec 1952. It is assumed, on the basis of relative frequency of exposure of Korean and Chinese cars, that no more than half the damage may be allocated to Chinese cars, or about 14,000 freight cars over the period of 30 months, or about 470 cars per month. For lack of specific information, it is assumed that about 1,000 damaged cars were out of operation for repairs in Dec 1952.

4. The total number of freight cars out of operation in Dec 1952 is therefore estimated at from 5,896 to 6,196 cars, or roughly 11 percent of the estimated total inventory, leaving an operable inventory of from 46,099 to 53,074 cars, as shown in the following tabulation.

Total estimated freight car park, Dec 1952	51,995 to 59,270	
Minus: Damaged cars from Civil War not repaired Oct 1951		5,296
Damaged in North Korea		14,000 1/
Constant inoperable park for normal repairs (4% of 51,995 and 59,270)	2,100 to	2,400
Gross deductions	21,396 to	21,696
Plus: Damaged cars from Civil War repaired after Oct 1951		2,500
Damaged cars from North Korea repaired to Dec 1952		13,000
Gross additions		15,500
Total cars estimated out of operation, Dec 1952	5,896 to	6,196
Total operable freight car park, Dec 1952	46,099 to	53,074

1/ Total number of cars damaged estimated at 33,000 from June 1950 to May 1953. This would give about 28,000 damaged from June 1950 to Dec 1952. It is estimated that half of those damaged were Chinese cars.